

Strengthening OpenMRS

Submitted by Jan Flowers (OpenMRS) on January 12, 2018 - 2:43pm

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Proposal Status: Awarded--Pending Funding

Executive Summary

OpenMRS is a high quality, open source, integrated EMR platform aimed at resource-constrained settings where structured patient record keeping systems (specifically, electronic medical record systems) can improve health outcomes. The Open Medical Record System (OpenMRS) was created in 2004 in response to an identified need for efficient data and information management to support enhanced care delivery and help achieve health equity in low and middle-income countries (LMIC). OpenMRS is a scalable, modular, open-sourced platform used by institutions and nations across the globe to build customized medical record systems that can meet the needs of varied situations. Over the past decade, the OpenMRS community has become a robust organization of developers, implementers and users actively building and supporting life saving health systems worldwide. As OpenMRS continues its growth in over 80 countries to date, it increasingly is recognized as a de-facto EMR standard, supported by the [OpenMRS community](#).

Despite financial constraints, OpenMRS has continued to provide technical updates to the OpenMRS content and software platform on a routine basis. OpenMRS functionality continues to be slowly enhanced and our community continues to be actively engaged. Up to this point, most roadmap setting and prioritization has been driven by our vibrant development community. However, implementers and users in LMIC are often hard to reach and engage. These important stakeholders have not been as visible to the OpenMRS development community due to inconsistent outreach by OpenMRS, a lack of communication strategies that appeal to those who are non-developers and in the field, and a perception that OpenMRS is solely a developer community primarily focused on software development.

OpenMRS seeks to further develop our products and services into a highly functional digital health software global good and, as a result, actively contributes to the global good milieu. We request support to improve our organizational efficiency and responsiveness through hiring resources to lead several core activities. Our maturity is reflected in our self evaluation for this application for Digital Square resourcing, using the Digital Health Software maturity matrix. Our self analysis reveals the competency and capacity of our organization and products, as well as potential areas for improvement. The OpenMRS community has identified core outcomes from fiscal support:

1. Increased implementer community engagement
2. Improved software roadmap
3. Expanded user and technical documentation
4. Curated and enhanced education curriculum and materials

Consortium team

OpenMRS is an open source community that functions as a consortium. Currently, the community includes volunteers and organizations who are actively engaged in operational support, as well as the software development and implementation process. We look forward to continuing a collaborative approach to development and implementation of OpenMRS with additional partners, and we expect that parts of the work in this proposal would be subcontracted to other OpenMRS partners. Please refer to our annual report for information about our partners.

Proposal

OpenMRS seeks to improve our organizational efficiency and responsiveness. We seek to better coordinate and support partner efforts, magnifying the impact of the OpenMRS-related work that they already do.

Over the years we have successfully built the preeminent open-source EMR platform by leveraging the efforts of hundreds of developers and dozens of organizations. We are keenly aware that we have also missed many opportunities to leverage requirements gathered on the ground, and to coordinate and support our partners' work, leading to fragmentation and duplicated efforts. Many of these failures stem from our lack of dedicated project managers to focus on partner communications and technical coordination.

This proposal is designed to ensure that our software addresses the needs on the ground by strengthening our engagement with implementers, and giving them as equal a voice in the setting of the roadmap as that of the existing strong developer community. In addition, we need to efficiently and effectively identify what opportunities exist in the distributions that could be leveraged and generalized to be included in our software. The OpenMRS community has started this process by beginning a quarterly scrum of scrums, providing a forum for our community members to highlight and share their work and highlighting potential synergistic development opportunities. We seek to extend the knowledge gathered from this forum into an actionable roadmap for product design, software development, and release. We desire to help seed the global good work by helping inform the enterprise health architecture repository being developed through the WHO Digital Health Atlas work by developing initial attributes for HIT Point of Care systems.

In strengthening the implementer voice, we also seek to more effectively identify and organize information gathered from a diverse user group through a sophisticated requirements analysis process. Our hope is to identify particular requirements and needs that have high ROI from a clinical and software perspective from our user community and use this information to inform the roadmap. Achieving this will require the identification and development of a replicable process and/or tooling solution for requirements gathering, assessment and prioritization. Developing and implementing a standard operational procedure for this is foundational for the OpenMRS community to become a more mature software development organization, resulting in a more transparent and rapid delivery cycle as well as better documentation and support of distributions. Furthermore, we believe that this process/tooling solution can be replicated within other global good software projects, and that OpenMRS is ideally placed to develop and demonstrate an effective community-driven requirements process.

Similarly, many countries and projects have written OpenMRS documentation and training materials, but we have not yet been able to leverage those efforts to create core shared resources. There is also an increasing demand for more robust documentation and training materials from OpenMRS implementers and users. A dedicated coordinator would be responsible for collecting existing documentation and education materials, planning and coordinating efforts to improve upon these, and to ensure they are publicly available as part of our community.

Improved communication is not always enough to get groups with different timelines to build shared software together. We further propose to strengthen OpenMRS software development capacity so that we can respond to our improved roadmap vision by seeding collaborative development efforts between partners.

Achieving these necessary enhancements requires support for the following functions (in priority order):

1. Community management
2. Technical project management
3. Documentation and educational support
4. Strategic support for software development

Use Cases, User Stories and Activities

The OpenMRS community has focused on collaboration in the implementation and long term sustainability of electronic medical record

systems using the methodologies popularized by open source practitioners. We gather and disseminate the stories around our collective work, as these case reports illustrate the development and deployment of software in specific situations and countries. These case reports inform the use cases we use to design. Our process helps build community, gathers the experiences from that community, and develops software and approaches to implementation that meet the needs of implementers and end users in a more agile and responsive way. However, we must improve the efficiency and effectiveness of this process through increased engagement of implementers as well as end users.

Core to our mission in this proposal is supporting a community manager position that can also provide some overall program management. Identifying the needs of the implementers and health care team members is a critical step in improving the value of our software. Recognizing and integrating this functionality into the the software requirement roadmap will help ensure that provision of technological solutions that will impact outcomes.

This work will help establish needed collaborations with others as well as the development of an optimized roadmap that embraces and integrates the needs of other organizations. Developing a shared roadmap will require us to actively facilitate both internal and external community members engagement in the process, using collaborative tools and other platforms as appropriate. The Digital Square Proposal process has highlighted multiple potential areas of intersection between the OpenMRS project with other proposals-- intersections that have the potential for great impact both within the OpenMRS community as well as others.

Here are examples of proposals that have the potential to be included in the OpenMRS roadmap through the establishment of collaborative workspace that includes collaborative tooling, planning, development and deployment:

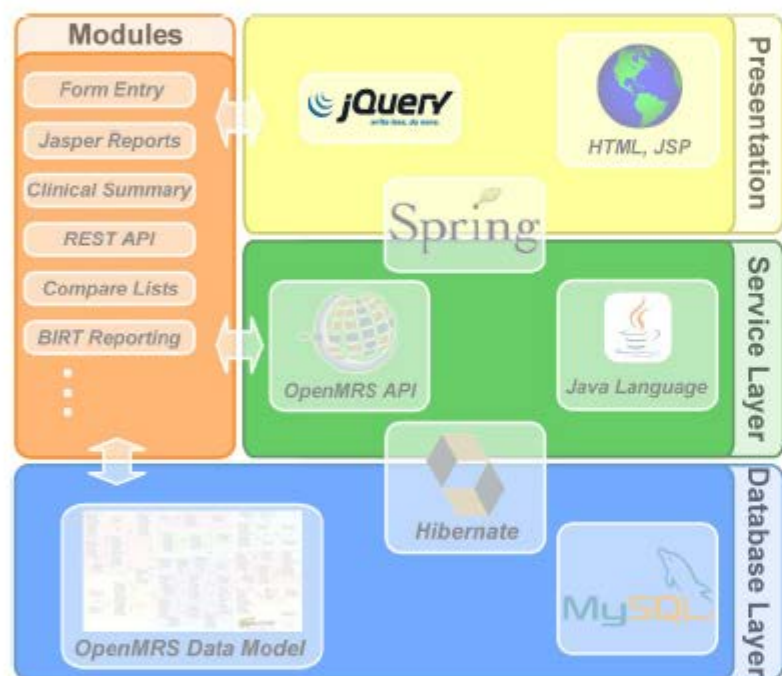
- OpenMRS Sync 2.0 has been a known priority in our community, but limited resources and project management have interfered with our ability to test and evaluate the solution for Sync 2.0
- OpenLMIS: LMIS is a critical part of the health care delivery cycle; integration of OpenLMIS with OpenMRS deployments has potential for great benefit, and can also drive increased attention to procedures as well as stock needs
- Pulse Tile: Pulse Tile proposes the use of 'tiles' as part of the UI design; OpenMRS has not engaged with UX designers in the past. While the tile proposal is not the only UI design option, attention to UI is increasingly important from a patient safety as well as usability perspective
- OCL: OCL is core at this time to terminology and concepts within OpenMRS. A more mature OCL process, enabling increased attention to a true terminology service in the near future, is critical to clinical decision support as well as analytics and business intelligence
- Packaging OpenSRP: OpenSRP is one of the emerging number of OpenMRS Distributions. OpenSRP leadership has expressed interest in leveraging OpenMRS community process, including community management, intellectual property protection, and fiscal sponsorship services. Supporting this proposal will have downstream benefits to OpenSRP as well as all of the other OpenMRS distributions.
- Design and Development of Patient Centric System (DHIS2): ensuring that there is an integrated and planned approach that allows all engaged organizations to effectively use their resources for the greater good; an efficient interface between DHIS2 and OpenMRS will enable the generation of DHIS2 reports from POC data, and facilitate a movement to true health status indicator development
- Bamhni as FOSS: Bamhni is another OpenMRS Distribution that will benefit from core support to the OpenMRS community. The OpenMRS community plays a rapidly growing role in creating a shared and supportive ecosystem.

The Digital Square activity has the potential to identify and exploit these potential shared opportunities based on funding and guidance decisions.

Digital Health Technologies

The OpenMRS platform is a generic platform for developing electronic medical record (EMR) system implementations. It is designed to collect and manage patient-centric longitudinal medical data. The platform consists of a database, an abstraction layer between code and the database (i.e., Hibernate, a tool to map between Java objects and a database), a Java-based service layer, and a web services (a bespoke REST interface and a standard FHIR interface). The data model is heavily influenced by the HL7 reference information model and uses a central concept dictionary to define the data it contains. As a result, the system is very flexible – not focused on a specific vertical use case – and can be adapted for any patient-centric health solution. The platform is also designed to be modular, making it extremely extensible by allowing customizations to be added or removed to meet local needs.

Multiple APIs are available, supporting interoperability. Proven interoperability already exists between multiple systems, and, in fact, OpenMRS has been proven to support case based reporting using the OpenHIE architecture.



We also use OCL for terminology support, and actively support this work. We have been working closely with OpenHIE, building and evaluating the ability of OpenMRS to share data through the defined OpenHIE architectural stack. More information is available at <https://wiki.openmrs.org/display/docs/Technical+Overview>

Community Feedback

It is critical that we continue to successfully leverage the resources of others. As we have observed and participate in the recent Bahmni transition, we have been struck by the value of working with partners who engage with ‘their feet’ – meaning a commitment to active contributions in specific projects. In addition, OpenMRS has an active [Advisory Board](#) where we seek advice on ways to more specifically meet our goals. Suggestions from the Advisory Board included holding competitions with limited prize money for specific development work – an avenue that has proven successful in many other technical development endeavors. As part of this ‘use case’ of how to be more successful and build a more robust platform, we will also be looking at the following activities:

1. Identification of a shared development model with other organizations working in the OpenMRS community. This may be a natural fit for the Digital Square proposals that are aligned and/or reliant upon OpenMRS
2. Development of 'competition modeling' for certain software development goals that are identified on the roadmap. We would envision evaluating and learning from others that have successfully done this, as members of our Advisory Board have experience in this area
3. Continuation of our Hackathons with possible expansion based on need and the addition of small monetary prizes
4. Solicitation of specific 'catalytic' ideas that are transformative from the community. We have internally proposed using the following criteria to evaluate, rack and stack, and ultimately fund these ideas (with small amounts of available funding):
 - Value to Health Equity (Is there improvement in health status?)
 - Patient Safety impact
 - Quality of Care impact
 - High Priority
 - Sustainability
 - Beneficiaries (To community, More limited context)
 - Consequences of inertia
 - Cost (limit to a predetermined small amount)
 - Time to completion
 - Other (TBD)

Our current and future plans center on ongoing and increased engagement with the broader digital health community. We will need to improve our transparency and our ability to have others actively engaged. This may require moving beyond the use of JIRA and our other tools to include some type of open program management software (TBD).

As of now, we have open leadership team calls once week, open Advisory Board calls every 2 months, and OpenMRS BOD Inc calls every 6 weeks. We have an [active online forum](#), as evidenced by increasing postings and use (as reported in our [annual report](#)). We publish our [operational plan](#) annually, and provide [quarterly updates](#) via Talk postings.

We expect to continue to increase our engagements, and look forward to active participation outside of our normal community, including increased activity at our Annual Summit meeting as well as other global health conferences. We would hope to broaden inclusion and representation at our implementers meeting through providing support for travel and presentations.

We desire to increase our commitment to diversity and inclusion through participation in additional opportunities such as Outreachy, similar to our commitment to GSoC.

Ideally, we want to work with the global health and global development OS community, recognizing that health is a result of many factors that are independent of the healthcare system. Capacity building throughout the HIT delivery model, as well as increased knowledge and attention to health informatics within the healthcare team is critical to the next decade of data use. Our inclusion of educational support within this proposal reflects our belief that developing core competency in development as well as clinical informatics is critical--and that the OpenMRS community is uniquely poised to develop and deliver this capacity building. Our work to promote distributions to foster use of open source to target specific use cases will help expand our community and promote the innovations we see happening to address issues in the healthcare system. We hope that our support, advising, and incubation of other projects, such as our Fiscal Sponsorship of Bahmni, will help contribute to a larger functional OS digital health care community.

Expected outcomes and metrics from this funding include the following

- Hiring a community manager with project management skills. We have already updated our position description, and would desire to hire someone in the global south to help meet this need
- Ongoing engagement with partners in the global goods space who share either similar work or complementary needs. See above list and comments
 - Develop new metrics to assess impact of these changes on the community and the implementations in addition to metrics that are identified above
 - Active use of this SOP by end of fourth quarter
- Develop and publish (along with lessons learned) a standard operating procedure and/or appropriate tooling for engagement, requirements identification and prioritization, and informing a roadmap for OpenMRS that could be used by others (current tooling is satisfactory for developers but incomprehensible to end users)
 - Active use of this SOP by end of fourth quarter
- Similar process development and publication to support bidirectional harvesting from collaborators of appropriate solutions to incorporate into OpenMRS platform and/or reference application(s)
- Establish a next generation version of our annual technical and community roadmap that is based on the institutionalization and feedback from the previous mentioned engagement model; New improved transparent roadmap process [led by CM, PM, and existing staff] with increased transparency to non-technical end users, implementers, and other global goods enabled
 - Roadmap process implemented
 - Roadmap process evaluated
 - Roadmap process published
- Better collaboration between OpenMRS Inc, implementations, distributions, and service providers around executing this roadmap
 - Evaluated through survey process

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- Core software development support to organize and coordinate partner work
 - Hiring of TPM
 - At least three partners actively engaged in the workplan creation
 - Begin work on the design and attributes of a health architecture repository for POC HIT solutions that can augment the WHO Digital Health Atlas work in this one domain
 - Development of draft health architecture repository list
 - Capacity building through educational support of software development as well as health informatics
 - Development of appropriate global health training for different members of the software and implementer/ healthcare team members
 - Publication of lessons learned on our wiki and/or other communication venues.

Global Goods Maturity Self Assessment

https://docs.google.com/spreadsheets/d/1SU1Ngn7nxLRurNTxmzm_Oiv6vTM81OQITbxHawaIT7k/edit#gid=0

Workplan

<https://docs.google.com/spreadsheets/d/1KYm9LEYmgR9kYGgMD2BmJqx3YvWMuxRmiKGmRcNd7r8/edit#gid=0>

Long-Term Planning / Next Phase

Our estimated annual funding need to fully support core software development for long-term growth as well as our community is approximately \$2.8 million per year (USD). This includes our current volunteer open source community contributions that are valued at approximately \$1.2 million per annum, leaving an unmet need of approximately \$1.6 million (USD). Specific development needs that have been identified, including additional functionality required to meet clinical needs such as non-communicable diseases, nutrition, enhanced maternal, newborn and child health (MNCH) as well as technical needs such as security support, infrastructure upgrades, cluster platforms and updated documentation, are not included in that base estimate.

It is critical that we continue to successfully leverage the resources of others. As we have observed and participate in the recent Bahmni transition, we have been struck by the value of working with partners who engage with ‘their feet’ – meaning a commitment to active contributions in specific projects. In addition, OpenMRS has an active [Advisory Board](#) where we seek advice on ways to more specifically meet our goals. Suggestions from the Advisory Board included holding competitions with limited prize money for specific development work—an avenue that has proven successful in many other technical development endeavors. As part of this ‘use case’ of how to be more successful and build a more robust platform, we will also be looking at the following activities:

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